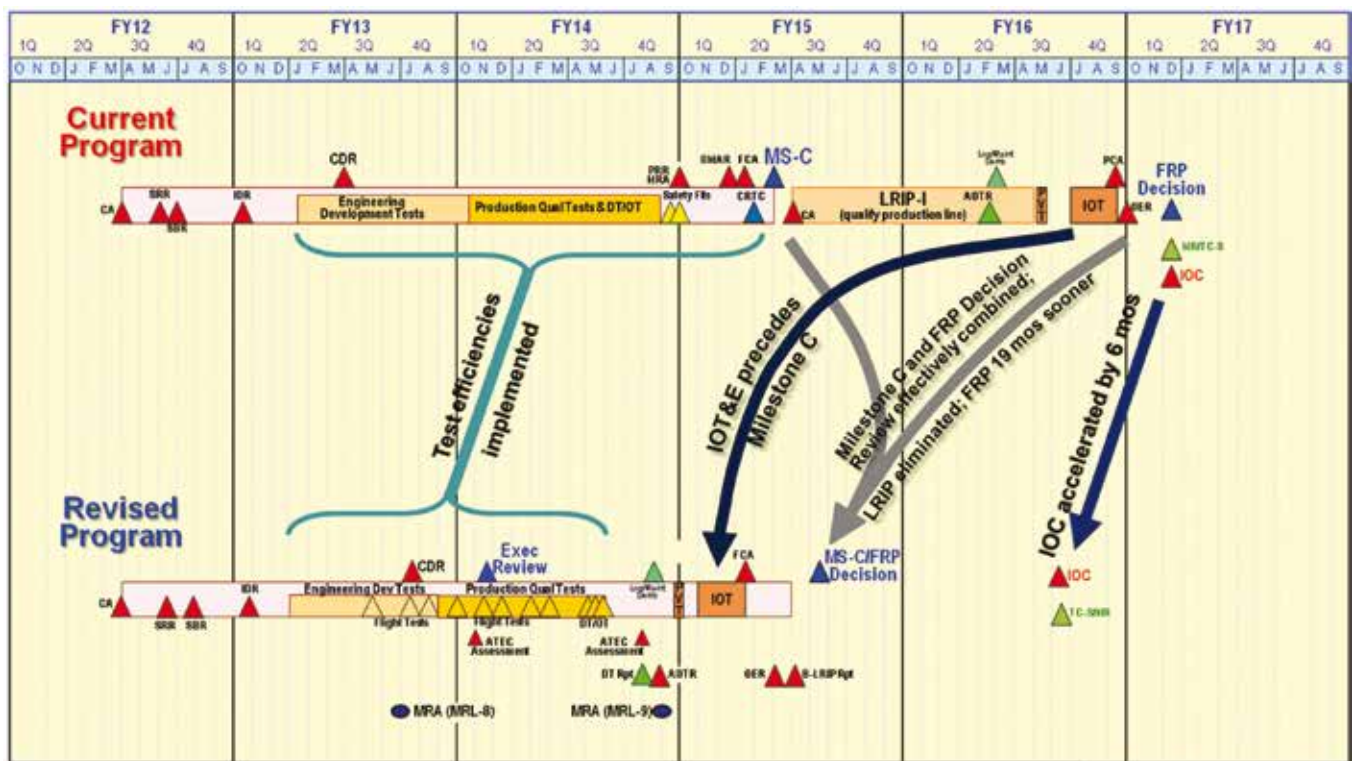


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Figure 1. Reduction of a Guided Rocket System's Program Time



The Product Manager, Precision Guided Missiles and Rockets (PM PGMR) has distilled Better Buying Power guidance into the team's mantra "Provide More Capability at a Better Value and Deliver It Faster While Sustaining It Longer." These guiding principles are executed by a committed team across the Precision Fires Project Office within Program Executive Office (PEO) Missiles and Space. We have accepted the challenge to execute cost savings and avoidance across the PGMR product line. The team's cost reduction initiatives are not only related to the original BBP initiatives but are focused on executing Kendall's guidance to pursue an optimal program structure.

The Guided Multiple Launch Rocket System (GMLRS) Alternative Warhead Program (AWP) is one program within the precision guided munitions portfolio that embraced BBP 2.0 initiatives through program streamlining and continuous "Should Cost" management. A transparent relationship across all Department of Defense (DoD) and industry stakeholders enabled a significant reduction of this program's length from 52 months to 36 months (see Figure 1) codified this year with a signed Test and Evaluation Master Plan (TEMP), Acquisition Strategy as well as modification of the existing contract to reflect the coordinated efficiencies.

Overall, the development remains on track to conduct 14 percent fewer test flights, reach Full Rate Production (FRP) 32 percent sooner, and field a critical capability 16 months earlier than the baseline schedule, all while using 10 percent less Research, Development and Engineering (RDT&E) funding. This equates to a cost savings of \$33.6 million in FYs 2014-2016.

Why is this effort to deliver capability faster and at a better value so important?

Growing Trend of MDAP Cost and Schedule Overrun

Look at history: The number of major weapon systems terminated because of schedule or cost overruns is increasing every year. The Final Report of the 2010 Army Acquisition Review examined the failure of Major Weapon Systems to transition from a new program of record to FRP during the last 2 decades. Between 1990 and 2000, seven Acquisition Category (ACAT) I programs were terminated. That number more than doubled between 2001 and 2010. Given this trend in the last 2 decades and the current budget environment, the next decade likely will be more dire. If that is not enough incentive, why else?

Senior Leaders Are Directing Us to Do Things Better

Kendall challenges PMs to ask a series of questions of themselves. These fundamental underpinnings to BBP became extremely important in shaping our path forward and understanding the risks involved.

How Urgently Is the Product Needed?

Policy necessitates timely development: The genesis of the AWP came from the "DoD Policy on Cluster Munitions and Unintended Harm to Civilians" that was signed by the Secretary of Defense on June 19, 2008. The policy directs that Cluster Munitions, like the GMLRS Dual Purpose Conventional Munition (DPICM), cannot be used after 2018 if they result in

more than 1 percent Unexploded Ordnance (UXO). The Army Acquisition Executive issued two Acquisition Decision Memorandums (ADM) in October 2008. The first ADM called for all future procurements of the DPICM to cease. The second ADM directed the Program Manager (PM) to undertake concept refinement of an Alternative Warhead (AW) for GMLRS that would comply with the Cluster Munitions Policy.

Capability gaps drive operational necessity: While the GMLRS DPICM rockets are still in the inventory, tactical commanders must receive approval by the Combatant Commander, reducing the tactical advantage of responsive precision fires when it is needed most. In July 2012, U.S. forces engaged an area target with 36 GMLRS Unitary rockets. Training Doctrine Command Fires Brigade analysis indicates the same mission could have been accomplished with four GMLRS AW rockets. Assuming a nominal cost of \$100,000 per rocket, mission cost would have been \$3.2 million lower (Unitary: 36 rockets x \$100,000 = \$3.6 million, AW: 4 rockets x \$100,000 = \$400,000). Additionally, the mission duration would have been reduced from minutes to seconds (Unitary: >20 minutes total, AW: <30 seconds total). The warhead design is simple and effective, adding to the combat-proven dependability of the entire system. This kind of operational necessity demands AW support the warfighter as soon as possible. This, perhaps, is the strongest statement that can be made.

What Are Customer's Priorities for Performance?

The Army's only cluster-munition-compliant surface-to-surface area weapon. The Army's current requirement to engage area targets and imprecisely located targets is cur-

rently satisfied by GMLRS DPICM. The cluster munitions policy defines cluster munitions as "munitions composed of a non-reusable canister or delivery body containing multiple, conventional explosive submunitions," yet acknowledges that "there remains a military requirement to engage area targets that include massed formations of enemy forces, individual targets dispersed over a defined area, targets whose precise locations are not known, and time-sensitive or moving targets." The GMLRS DPICM was the Army's precision fires solution to hit area and imprecisely located targets, but is not, and cannot be, made compliant with the policy's UXO requirement. The continued requirement for an area-target capability was validated for AW in the Nov. 8, 2008, Joint Requirements Oversight Council (JROC)-validated Capability Development Document. The AW rocket will engage the same target set as DPICM. Because of the level of commonality between AW and both DPICM and Unitary, AW will have the same range capability, launcher compatibility, and accuracy as the other GMLRS variants.

How Prepared Is Industry?

Straightforward design of the warhead and technology maturity of the GMLRS allows focus on warhead effectiveness:

Prior to Milestone B (MS B), the Precision Fires test team, in concert with the Army Test and Evaluation Command, identified a number of test efficiencies supported by their confidence in the warhead design. The TEMP written before MS B was generic with respect to warhead performance testing because the program was undergoing competitive prototyping of three warhead designs. Upon design selection for Engineering, Manufacturing and Development (EMD), the Product Office

Figure 2. Guided Rocket System With Change in Warhead Only





Inset: First Guided Multiple Launch Rocket System Alternative Warhead flight test. Missile approaches target.

Above: Warhead detonates on the ground.
U.S. Army photos

tailored the test program specifically to the selected warhead design. The team also leveraged a high level of commonality with the GLMRS Unitary rocket to focus on only those tests needed to demonstrate and characterize warhead lethality. The GMLRS AW rocket is based on a materiel change to the current production GMLRS Unitary rocket, which is at Technology Readiness Level (TRL) 9. The rockets remain 90 percent common as illustrated in Figure 2, with only the warhead section being different.

Mature production line capability key: The high level of commonality between the rocket variants and the maturity of the shared GMLRS production line allows for a nontraditional acquisition approach to Initial Operational Test and Evaluation (IOT&E). The Department of Defense Instruction 5000.02 process provides for a Low Rate Initial Production (LRIP) period following the MS C. According to Title 10, United States Code, Section 2400(b), LRIP is intended to

- Provide production-configured or representative articles for operational tests.
- Establish an initial production base for the system.
- Permit an orderly increase in the production rate for the system sufficient to lead to full-rate production upon the successful completion of operational testing.

The current GMLRS Unitary rocket production line is assessed at Manufacturing Readiness Level (MRL) 10, and the AW warhead will be a form-and-fit match with the Unitary warhead. The production line will be shared with interchangeable Unitary and AW payloads based on need. As such, only minor tooling and process changes are required for Production Qualification Testing (PQT). At the conclusion of PQT flight tests, Production Line Validations and the Manufacturing Readiness Assessment, AW will have demonstrated MRL 9, indicative of a LRIP production line ready to produce test articles for IOT&E.

What Resource Constraints Will Affect Program Risk?

Time. These test efficiencies will allow FRP and Initial Operating Capability (IOC) to be achieved sooner. Progress must be watched carefully, as reducing schedule also means there is less time to recover from challenges typical of an EMD program. While commonality with Unitary does reduce technical risk, it is not assumed that risk is eliminated completely.

Funding. Over the past year, we have seen schedule risk grow due to Continuing Resolution Authority and Sequestration. These two actions impact the program schedule by placing constraints on funding availability, contractual need dates and time to execution. The AW program fully expects this scenario to continue in the coming fiscal years and is planning alternate, contingency and emergency means to keep the program progressing on schedule and cost as well as possible.

Materials. Tungsten penetrators and explosive chemicals represent 80 percent of the warhead's cost. Few suppliers can deliver these materials in suitable quantities and none

are domestic sources. This reality limits competition and opportunities to drive down base materials costs. Advanced pricing agreements cannot mitigate politically induced availability and risks.

Is Cost or Schedule Most Important, and What Are the Best Ways to Control?

It's a toss-up. A strong argument can be made for either cost or schedule. The enactment of the cluster munitions policy places criticality on schedule. FRP must begin in FY2015 to ensure adequate quantities of AW can be produced prior to the policy enactment. This is based on several factors, not least of which is synchronization of production deliveries with the Total Army Munition Requirement (TAMR) quantities for FY2015–FY2019. Average Production Unit Cost (APUC) estimates are subject to change during EMD, and the demand comes when DoD is seeking to reduce budgets, not increase them. Therefore, controlling cost is essential to ensuring that the AW remains an affordable capability.

Program Controls. The program controls schedule and cost by various methods. The rocket will be 90 percent common with the Unitary platform. This fact alone provides schedule and cost benefits. A Firm-Fixed-Price (FFP) contract with performance-based payments helps mitigate cost growth typically associated with Cost Plus type EMD programs. However, this can be a hard sell to the contractor.

The following are my observations based on experience as an assistant PM on a major defense acquisition program implementing our “optimal program structure.”

Getting Buy-In

Implementing “Should Cost” management principles is challenging. In the AW case, the goal was to update testing requirements to reduce the developmental timeline. The Product Office began a two-pronged approach: (1) update the TEMP and Acquisition Strategy, and (2) simultaneously gain support from key stakeholders (Test and Evaluation, G3/5/7, G4 agencies from Headquarters Department Army Staff and Office of the Secretary of Defense). While the former action was administrative in nature, the later became a critical supporting action. Signatories were informed in advance of how and why we were modifying the TEMP and Acquisition Strategy. Staffing did not become an iterative process. This open, upfront, and direct approach boosted the confidence of all stakeholders to embrace a new strategy.

Turning the Ship


Anticipating a need to act quickly, the Product Office began parallel actions to emplace the “Should Cost strategy.” The Acquisition Strategy and TEMP were updated to quantify the changes required. Our previous engagement of key stakeholders ensured that these documents moved to approval. The current contract limited how much “preparing” the prime contractor could do. However, to meet the MSC and FRP strategy, the program needed to reorient immediately. Baseline contract

activities were ongoing and certain contracted tasks needed to cease or risk sunk costs for unnecessary work. Significant testing would begin within 60 days. The prime contractor required contractual guidance to begin reconfiguring hardware to support our new direction. The immediate challenge became obvious. Several contract solutions were required to reorient the program. First, the Procurement Contracting Officer (PCO) sent a limited stop-work letter for Contract Line-Item Number tasks that were not needed. Based on the expected approval dates for the updated TEMP and Acquisition Strategy, a definitive contract modification could not be completed in time to maintain schedule. To mitigate this risk, the PCO worked with the prime contractor to prepare and award a not-to-exceed (NTE) change order to the existing contract. This NTE provided a contractual “bridge” until completion of a modification to the contract in third quarter FY2013.

Act Tactically, Think Strategically

Without proper focus and direction, any successful path can become fraught with risk. There are ways to minimize impact and likelihood of occurrence. However, this requires “acting tactically and thinking strategically.” The efficiencies gained through use of “should cost” management principles do come at a price. The schedule can become very fragile and must be protected by vigilant management. Delays from various issues can desynchronize interdependent and sequential tasks. Our program employs recurring Integrated Product Teams (IPTs) along functional areas. While these teams are not a new concept, they must be free to act tactically. The AW program has achieved monumental success albeit with challenges in navigating through all the decision authorities en route to approval of the appropriate documentation. At the IPT level, the ability to make decisions that will be supported up through to the signatories continues to improve. At the stakeholder level, “thinking strategically” is the focus. To promote this environment, biweekly stakeholder coordination meetings and quarterly Management Roundtables are conducted to enhance program success at all levels. For these members, it is important to remain vigilant in assessing where “seeds of risk” are being introduced by our actions today.

No One Said It Would Be Easy

In our attempt to find and implement an “optimal program structure,” we have had success and failure. Today, we are on a solid course to achieve our goal of providing a munition that is more capable, a better value, and faster to the warfighter. The AW is structured to “optimize” the program’s chance of success. This is a good news story for both the warfighter and the taxpayer. We re-emphasized the success of the GMLRS Program by building on commonality and investment that has already been made. This saves money and speeds delivery of capability. The Alternate Warhead Program is a model of success for both new programs and new increments of existing systems. 

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